



Chambers's Journal

SIXTH SERIES.

THE HUSBAND OF MILLICENT.

BY GEORGINA M. SYNGE.

CHAPTER I.

MILLICENT felt dull: she had finished the instalment of literature provided by Mr Mudie. It was a wet day, and she was all alone. Her husband had been suddenly called from home by the illness of his father, and had been away for nearly a week.

Of course he was obliged to go. She herself had urged him to do so. All the same, this did not prevent her from feeling it to be a very disagreeable necessity. That she, a bride of only a few weeks' standing, should be left to herself even in so good a cause was distinctly disagreeable. It was disagreeable and it was unusual. She took care to explain the situation to her friends. Millicent was sensitive as to the world's verdict upon her marriage. She was not particularly good-looking, and she possessed most of the money. That their conjugal relationship, in spite of these drawbacks, should shine forth as ideal was her great desire; that it should be admitted by all observers that she had been married for herself alone. Now Millicent regarded herself very seriously; and she regarded other people very seriously too. The parish, her husband, even the boy who cleaned the boots, were matters to be pondered over; their words and actions had to be seriously considered and weighed. All this of course occupied a good deal of time; and as it is a known fact that words and actions in this disappointing world are seldom consistent, and very rarely agree—except in the case of dull bores or idiots—it was not altogether a satisfactory study.

It had not been altogether satisfactory with regard to her husband. It was not that his conduct left anything to be desired. He was affectionate. He was almost unselfish. He was very kind. It was in himself, in his nature, that the disturbing element lay. There were contradictions in him which she could not understand; they

baffled her. She could not classify him, so to speak. She could not arrange him to her mind.

He had many admirable qualities, no doubt. He did his duty. He worked the parish with zeal. There was little mixture of mamon in his life. And yet she felt, she hardly knew why, that he was not altogether and only this. He was something besides. It appeared to her almost as if he were two men.

It was only very occasionally that she caught a glimpse of the other man. As a rule he was entirely the orthodox and conventional rector of an important parish. But just as she had settled herself into admiration of this aspect of his character he would utter a few words which revealed something startlingly opposite.

It disturbed her. She had been accustomed to people whose sentiments and emotions, in ordinary circumstances, could be calculated to a nicety. Given an Irish land-bill, a High Church curate, or an Advanced Woman—and you could rely exactly upon their views.

But she never felt that comfortable certainty about Henry. He appeared sometimes in his soul of souls to have sympathies against his own views. She had sometimes the horrible doubt as to whether he really believed in his views. Sometimes it seemed to her as if he had forgotten them, as if he had mislaid them—as one mislays one's umbrella—and was making use of those belonging to another person. It puzzled her—puzzled her all the more because he was so unmistakably a good man.

Another thing which puzzled her was his reserve. He was frank and outspoken, and yet he was reserved. You could not exactly tell which he was going to be. He would begin to talk about his tastes and his ideas, and would suddenly come to a stop. He would begin some interesting description of a bygone scene in his life, and

suddenly break off and turn the conversation to other things. It was as if there were something in his memory from which he shied away; something he dreaded which was always looming near and which he must avoid.

She used to wonder about these past years. He had taken orders some while after leaving college, at the wish of his dying mother. How had he spent the intervening time?

A careful perusal of modern literature had convinced her that perfect candour with regard to their mutual past was the only satisfactory foundation upon which to begin married life.

But Henry had revealed curiously little. The small and meagre past which he had unbosomed might have been proclaimed upon the house-tops without any discredit to his cloth. It disappointed her. She was a high-minded woman, and yet it disappointed her. She would have preferred something not exactly black, but perhaps a little gray, not unnaturally and wholly white. It would have made her feel more satisfied that nothing had been held back. She would know the worst; most likely only a mild and easily-forgiven worst. But still she would know it. There would be satisfaction in that.

During the long, lonely week she had brooded a good deal upon all these matters. She felt a curious mixture of feeling—annoyance with her husband for giving cause of annoyance, and with herself for feeling annoyance, being part of this contradictory condition. She felt she was foolish and unreasonable, and yet she could not drive the feeling away. And to-day she had made up her mind that she was altogether foolish and unreasonable—after a couple of hours spent in staring gloomily into the fire, and listening to the rain beating against the window and the howling of the wind outside.

After all she had a very happy, comfortable home. The house was roomy and old-fashioned, and furnished exactly to her taste. The garden was admired by all her friends. The parish was grateful and appreciative. The neighbours more than friendly. And Henry was always good and kind. As she looked at his empty chair opposite her, she saw a vision of him sitting there with his book—large and kindly and anxious to please—and her heart warmed. Yes, she was unmistakably foolish.

Presently a happy thought struck her. Henry had a good many books in his study. Perhaps she might find amongst them something to read. At any rate it would be pleasant to visit his own particular den, and look at his belongings. It would be a pleasant change.

She got up from the comfortable low chair on which she had been sitting, and placed the guard upon the fire; and she opened an inch of the window, and picked up a few leaves which the hydrangeas had shed upon the floor. Then she left the room and walked upstairs.

The study was rather curiously situated. It was at the top of the house, upon a floor which they did not use—a most unusual place for studies. But Henry had explained that he liked plenty of air and light, and that he could not write his sermons in the midst of noises and disturbances, and here certainly was perfect quiet and peace.

It was a cheerful room, with a large bow-window and deep sill in which you could sit and admire the spreading view, carrying your eyes over the little white village on the hill-side and down the far-reaching valley which dipped into the horizon beyond.

She sat down and looked around her, noting every detail with interested eyes. The room was plainly, almost severely, furnished. The only easy-chair was stiffly upholstered in unyielding leather. The floor was oak-stained, and had a simple square of matting in the centre. There were shutters to the windows, but there were no curtains. Bookcases made by the village carpenter covered part of the walls, the rest of which were conspicuous by the absence of pictures of any kind.

Presently Millicent got up. She went to the bookshelves and began to inspect the rows of volumes which they contained. She picked out one or two that she thought she would like, and then she began curiously to examine the rest. Shelf after shelf she scanned, getting up into a chair to view those at the top, and even putting her hands behind on the chance of some discovery. But no. There was nothing of startling interest of any kind. It was an ordinary clergyman's library, nothing more. There were Fathers of the Church, Concordances, Commentaries, Bampton Lectures, Ecclesiastical Histories, the Lives and Works of many eminent persons, and a certain number of volumes 'without which no gentleman's library is complete!'

But somehow they had the look of books which told no tale, books from which the taste of the owner could never be gathered. There appeared to be no special corner for favourites, no worn and much-used copies, no pet edition tucked into a chair or lying at an open page on the table. 'If there were only a stupid yellow-back it would be something,' said Millicent with a little disappointed sigh.

She came and leant over the high back of the oak-chair in front of the writing-table, and stared curiously in front of her. Everything was immaculately neat: the inkstand; the pens; the sermon-paper, which lay in a pile by the blotting-pad; the dictionary, the Concordance, and Dr Liddon's Sermons, which lay ready for use close at hand.

Two photographs, somewhat faded, of his father and mother, in a folding leather frame, were the only ornaments to be seen. There were no college mementoes—no silver cups, no trophies

of athletic days—nothing that gave evidence of any predilection of any kind.

Millicent turned away. She slowly gathered up her books and went out into the passage.

As she did so she remembered that she had never been into the room next to the study. It was locked when she had tried to open it, and she had always forgotten to ask Sarah for the key. It was over the spare-room, and must be a good size. Some day they would have to furnish it. Living there by himself, Henry of course had not required any other rooms upon that floor. There were three of them. One she knew contained boxes, the other was empty, and there was this one that she had not seen. She would look in and see what it was like.

Somewhat to her surprise, however, when she turned the handle of the door she found it was still fastened, nor was there any key in the lock. Just as she was wondering what she should do, she heard Sarah the housemaid coming upstairs, and she leaned over the balustrade to speak to her.

'I want to look into the room near the study; why is it locked and no key?' she inquired.

But Sarah appeared as if she did not hear. She continued her way to the bedrooms, when Millicent called to her again and repeated her question.

The woman came slowly to the foot of the stairs. 'It's always kept locked, ma'am,' she replied, a curious look Millicent could not understand coming over her face.

'Well, where is the key? It ought to be in the door.'

'I don't just remember where it is. I expect it's got mislaid, ma'am.'

'Mislaid! Why, I'm sure I heard you overhead when I was arranging the new toilet-set in the spare-room this morning. Some one was creaking about, and of course it must have been you.'

'Rooms has to be aired,' answered Sarah rather gruffly, as she gave a sidelong glance towards the backstairs.

'Yes; I never said to the contrary. What I mean is, the key can only be lost since this morning, and I shall expect it to be found. I mean to look over the room to-morrow.'

And Millicent, rather vexed at what she looked upon as the whim of an old, spoilt servant—for Sarah had been with her husband's family for many years—walked off with her books and settled herself once more in the cosy Chesterfield sofa by the side of the fire.

The next day, after ordering dinner and attending to various domestic duties, Millicent went up to her room, where Sarah was engaged in dusting.

'Well, I hope you have found that key,' she said rather sharply. 'I am going up there now.'

'I can't say I have, ma'am,' replied the woman as she began re-arranging the set of the curtains.

'Have you looked everywhere, and have you asked the other servants?' demanded her mistress. Sarah's apparent apathy in the matter was most annoying.

'Oh, the girls don't know anything about the room. The master doesn't like them up there, messin' round.'

'Well, it's very tiresome losing it like that; and, as you don't seem as if you could find it, I shall call and tell a man to come and fit a new key, when I go to the village this afternoon.'

Sarah turned round with a startled look in her face.

'I wouldn't be doing that if I were you, ma'am,' she said as she began to twist the corner of her duster nervously in her hands.

Millicent stared at her with wide-open eyes of surprise.

'I beg pardon for saying it, ma'am,' she continued reluctantly, as if the words were dragged out of her—'I beg pardon; but I don't think the master would like anybody to open that door.'

'Good gracious! what do you mean?' cried Millicent, 'as if that has anything to do with me!' She felt nettled at the idea of Sarah imagining anything so preposterous.

'Well, ma'am, I only know what the master said, and that was that the door wasn't to be opened by nobody.'

'How ridiculous you are! That does not in the least apply to me—how should it?' But in spite of herself an undefined feeling of dread was creeping into Millicent's mind.

'It isn't for me to say it, I know, ma'am; but I wouldn't go in if I was you.'

'Why not?' demanded Millicent, in an unconcerned a tone as she could command.

'I can't tell you, ma'am; but the master—' here Sarah stopped short, and waved her duster tragically to supply the place of further words.

Millicent stood staring at the old servant, uncertain what course to take. She felt it would be undignified to question her further on a matter which implied that her husband had hidden something from her. No; no vulgar curiosity would she display. She would wait till Henry's return and he would of course put it all right. That was the most sensible plan. Other women might try to worm it out of the servant or force open the door; but Millicent had too much pride for either one or the other. She preferred to wait.

'It is perfectly ridiculous, and must be all your own imagination,' she said at last, and without waiting for a reply swept out of the room and downstairs into the drawing-room.

But tears were in her eyes as she threw herself into an arm-chair and began to think things quietly over.

There was something in it after all. He had some secret he wished to hide from her—some-

thing he did not wish her to find out. And it was in some way connected with that room. It seemed so mysterious and extraordinary. And to think that a servant should know all about it, whilst his own wife was excluded! The thought made her heart beat in angry thuds. It was so entirely contrary to her views as to what married life should be—the modern improved views; for Millicent was extremely interested in all the new ideas as to the improved position of her sex. The recognition of equality of rights in married life was to her a very serious matter. That there should be reciprocity in confidence as well as interests appeared to her as a most important part of this position.

With all these sentiments Henry had seemingly agreed. He was as modern in his ideas as to a wife's position as she could wish. But now it appeared as if they were merely a cloak. He had his reservations all the same.

At any rate it looked like it.

However, she must not judge too soon. There might be an explanation after all. It would be wiser, no doubt, to wait and see what Henry had to say, and until then not to worry herself about it. It really was absurd to worry, when it might be nothing at all.

She managed to argue herself back into cheerfulness again; and the next day she ate her breakfast in better spirits; and when the parlour-maid brought in a pile of letters she picked out the envelope addressed in her husband's handwriting with a sensation of particular affection.

But when she had broken the seal and scanned the contents her face fell. He said that her father-in-law was worse; it would be impossible to leave him for the present. He had arranged for some one to take his duty on Sunday, and hoped things would go on all right. He was very concerned at leaving her all by herself. Could she not get a friend to come and stay until his return?

Millicent read and re-read it several times. It was very annoying. She felt sorry for her father-in-law, for Henry's anxiety, and for the inconvenience it would entail; but, through it all, she knew she was sorry for herself. She would have to wait perhaps for some while to find out what she so much wanted to know. She felt ashamed of herself for allowing so selfish a thought to influence her at such a time; but there the feeling was, and she could not help being aware of it.

She busied herself that morning in packing up a small portmanteau with things that Henry might want, and paid some visits in the parish to sick people who would be expecting to see him.

The next day the news was no better, and the day after that it was worse; and so another week passed away. Millicent became more and more restless and uneasy. She could not take an interest in her usual occupations, her thoughts

kept flying back and back to that mysterious locked door. She felt that at any cost she must gain admittance and see for herself what was there, if only to restore her peace of mind. For whatever it was, she felt she could bear it better if she knew, and that any revelation would be pleasanter than this harassing uncertainty.

At last, after much consideration, she determined what she would do. She would mention it in her next letter—not as if she suspected anything, but casually, in an easy natural manner. There seemed little prospect of his returning for at least another week, and she felt she must have her mind put at rest.

So, after telling him all the parish news and the actual little details about herself and her doings, she said: 'By the way, Sarah has some ridiculous story about your not liking me to go into the room next the study. I believe she has lost the key on purpose. Of course it is all her imagination, and I only mention it to you as I think you will be amused. I am going to have it opened. I want to see if it won't make a nice bachelor's bedroom.'

Millicent read this over with some satisfaction. No one could possibly guess that she thought anything more of it than of a perfectly natural occurrence. She would not for worlds have Henry think that she had any unpleasant thoughts upon the subject, especially as there might be nothing in it at all.

She carefully sealed the letter and took it herself to the post, and awaited an answer with an amount of impatience which she in vain tried to subdue. At last it came. It was a short, little note telling her the news about the invalid, and full of hopes of rejoining her soon. And at the end came a postscript evidently written in a hurry, saying, 'Don't go into the room next the study.'

Millicent gasped. She read and re-read that last sentence again and again. 'Don't go into the room next the study!' So it was true after all! He had some secret he wished to conceal from her.

And after all it was not the thing itself, whatever it might be, which angered her. It might be something quite satisfactory and unimportant. It was that her husband should keep it from her knowledge; that he should treat her with such scant courtesy, not to speak of confidence, as to allow a servant to know what was withheld from his wife.

However, her pride came to her rescue in answering the letter, and a woman's instinct for concealing her feelings prevented her from in any way alluding to the subject. Nor did she write less lengthily or affectionately than was her usual custom.

But when it was finished she resumed her injured feelings and brooded over her wrongs, as she at length began to consider them, until their swollen proportions quite obscured all other points of view.

THE EVOLUTION OF THE MAGIC-LANTERN.

By T. C. HEPWORTH.



EARLY forty years ago there appeared in this *Journal* (Vol. XII., July 12, 1859) an article entitled 'Shadows in a New Light,' by Col. J. J. Mellor, M.P. It dealt with what at that time was, in the Midlands at any rate, an astounding novelty—the exhibition of 'illuminated photographs' or dissolving views, by means of the oxy-hydrogen or 'magic' lantern, as it was then commonly called. The Manchester Mechanics' Institute had during the previous winter inaugurated a series of exhibitions of this character with very great success, and the article referred to points out the educational importance of such a means of portraying distant scenes and objects of art to the multitude.

During the four decades which have elapsed since that article was published, the lantern has become such a very popular instrument in the hands of all teachers that there is certainly no place in the kingdom where it is not regularly, or at least occasionally, employed. It is therefore a matter of some interest to trace its history and to indicate its varied applications.

It has been thought by some writers that this method of projecting pictures upon a sheet or other surface was known and employed some hundreds of years ago, and the chief ground upon which this belief is based appears to be a passage in the autobiography of Benvenuto Cellini, the Florentine goldsmith and sculptor, who describes a weird experience in the Colosseum of Rome, when, by means of certain incantations, several legions of devils were made to appear before him. Now, it is quite certain that no effects of the kind could be produced in a building of the vast size of the Colosseum without the best of optical appliances and the most brilliant light—both unattainable things in the first half of the sixteenth century. So we must assume that the imps which Cellini saw, or thought he saw, were optical illusions brought about by some other agency than the magic-lantern.

A hundred years later Athanasius Kircher, the learned Jesuit, produced his book on 'the great art of light and shade,' in which he describes and pictures certain contrivances which plainly show that he was fully acquainted with the optical principles upon which the lantern is based, and very possibly if he had had at his disposal a better illuminant than a rush-candle or a smoky oil-lamp he would have reduced theory to practice. For want of an efficient lamp the magic-lantern made little progress beyond toyland till after the year 1826, when Lieutenant Thomas Drummond used in the Irish

survey the so-called Drummond Light or lime-light, invented a year or two before by Sir Goldsworthy Gurney.

In the year 1838 the Polytechnic Institution in Regent Street, London, was incorporated by royal charter, and within a few years of its opening we find, by reference to the early catalogues, that 'dissolving views,' shown by the lime-light, formed one of its attractions. It was the province of this institution, the prototype of the many which now exist with wider educational aims, to combine amusement with instruction, or, as the catalogue quaintly puts it, 'The directors have not been unmindful of the inducement which a path of flowers opens to the acquisition of knowledge.' One of the flower-beds was represented by a battery of magic-lanterns, by which hand-painted pictures on glass were projected upon a screen of large size. So long as the pictures for the magic-lantern had to be drawn and painted on glass by hand it could be regarded only as a toy. The form of the Polytechnic instrument was cumbersome, for the pictures measured as much as eight inches across, and the lenses were of proportionate size. (Some of these pictures, by the way, were veritable works of art, and cost as much as twenty pounds apiece.) It is obvious that, under such conditions, the magic-lantern in this, its best form, had but limited use. But directly it became possible to produce pictures of far finer quality, at a fraction of the cost, by means of photography, the toy became a valuable scientific instrument. The photographic pictures, too, were reduced in size to little more than three inches, and this made a general reduction in the dimensions of the lantern possible and desirable. Thus the magic-lantern became a marketable thing, which can be produced at a cheap rate, and pictures adapted to it, illustrating travel in every corner of the globe and every department of science and art, can be purchased for one shilling apiece. The aid it affords to the traveller in rendering more graphic his account of his own experiences is incalculable.

Another very important aid in popularising the optical lantern—for the toy name 'magic' has been dropped in deference to its more exalted uses—is the introduction of compressed oxygen and hydrogen gases. Without these gases the lime-light is impossible; and a few years back the operator was obliged to go through the drudgery of making them himself, and storing them in huge india-rubber wedge-shaped bags, which, placed under pressure, would serve for a couple of hours' exhibition. These bags, their pressure-boards, and heavy weights are now things of the

past, and the lanternist obtains his gases compressed in cylinders of mild steel. The oxygen is produced by chemical process from the atmosphere, and for hydrogen the ordinary gas used for illuminating purposes (carburetted hydrogen) furnishes an efficient substitute. A cylinder little larger than a wine bottle will hold ten feet of gas, which is sufficient for an evening's use. The gas-jet employed for the lime-light is in reality an oxyhydrogen blowpipe, and its flame impinges upon a cylinder of lime, which is thus rendered incandescent. In brilliancy it has but one rival, and that is the electric arc-light.

Now that the electric current is being laid on to our public halls, the use of the arc-light for lantern work is receiving much attention. No one who has not seen the lime-light and electric light each illuminating one-half of a white screen can form any idea of the immense advantage of employing the latter for this purpose of pictorial projection. It is not only far more powerful as an illuminant, but it is much whiter—that is to say, it is much purer in tint. For experiments in which coloured rays enter, it is indispensable, and no one would think of using the prism for spectrum analysis work, if the results are to be projected upon a screen, without its help. It has the advantage also of simplicity, a couple of wires from the house supply of sufficient capacity to carry the necessary current taking the place of the cylinders of gas necessary with the lime-light. At all lecture-halls where the lantern is in constant use the arc-light is superseding the older form of illumination. The incandescent form of electric lamp has been recommended for use in the optical lantern, but the illumination which it affords is far too feeble for use except in a small room; besides, to get the best effect the area of the light-spot must approach as nearly as possible to a point, and not cover a large surface.

The optical lantern is not confined to the exhibition of pictures and diagrams, but can to some extent be employed for showing experiments in the lecture-hall or in the school-room, and it is particularly valuable in this rôle because of its powers of magnification. All science teachers know well that certain experiments of vital importance to the full understanding of the subject under discussion are comprised within such narrow limits that they are confined to the individual eye, and cannot be effectively exhibited to a class. Let us, for example, suppose that a lecturer wishes to show how by means of a magnet a piece of steel can be readily endowed with magnetism. As an illustration he will perhaps take a sewing-needle, rub it with the magnet in the orthodox manner, and show that it will thenceforward attract iron filings—which will cling to its end until it looks like the head of a mop. He may explain all this to his audience, and the students close to the lecture-table will perhaps be able to see the result of

the experiment. But put the needle before and after magnetisation on the lantern stage together with the iron filings; it will be magnified to the size of a scaffold pole, and the particles of iron will be seen to fly towards it in a manner impossible to show in any other way.

The lantern is constantly in evidence at the lectures at the Royal Institution, London, and occasionally some very remarkable experiments are shown by its aid. Not long ago Professor Dewar was able to exhibit in this way a frozen soap-bubble floating in a tiny glass tank of liquid air, while a miniature snowstorm was going on in the space above the floating bubble. Here was an experiment, the apparatus necessary to which was comprised within the space of two or three inches, enlarged by the lantern to six feet or more, so that all in the crowded lecture theatre could thoroughly appreciate its beauty.

A modified form of lantern will permit of the exhibition of solid and opaque objects instead of transparent pictures. In this case the object to be shown is very strongly illuminated from the front, and a lens throws its image on the screen. For showing mineral specimens or precious stones in all their natural colours this method is invaluable. It has also been employed for illustrating a lecture on the evolution of the watch, various forms of those timepieces being shown upon the screen *with the wheels in movement*. All kinds of small objects can be shown in this way, and by means of larger apparatus greatly magnified; the human face has also before now formed a curious object on the screen. It must be admitted that this last experiment can only be carried on for a few moments, in mercy to the person to whom the face belongs, for the heat from the powerful lights necessarily used is comparable only to that of a furnace.

The image shown by the ordinary lantern is an inverted one, and in the exhibition of pictures the difficulty is readily met by inserting them in the lantern upside down, a necessity which has again and again led to ludicrous mistakes. But it is obvious that in many of the experiments here detailed inversion is impossible, and in such cases rectifying apparatus has to be employed to show things the right way up.

A special form of microscope can be attached to the optical lantern in order to show ordinary microscopic objects which without it would be only available to the individual eye. Even with the electric arc the effect is poor, for the aperture of a microscope lens is so small that very little light can get through it, and when the image is spread over a large screen that little is naturally much attenuated. It therefore comes about that only those near the screen can see the details of the subject. A far more effective plan is to show in the ordinary lantern enlarged photographs of such objects, photo-micrographs as they are called, and then there is no limit as to light. The

amount of magnification possible by exhibiting microscopic pictures in this manner is almost beyond belief. But let us take an example. The writer has some photographs of this kind in the form of lantern slides which measure two and a-half inches in diameter. In the work of photographing them the original objects have been magnified one thousand diameters. Now, if we place one of these pictures in the lantern, and project its image on a screen measuring fifteen feet, magnifying the picture to that size, we shall stretch it seventy-two diameters, so that the total magnification of the original object is no less than seventy-two thousand times. Suppose that it would be possible to show the image of a half-penny magnified to the same extent, we should require a lantern screen much more than a mile long to exhibit that image in its entirety. For a halfpenny measures exactly one inch, and seventy-two thousand inches are equal to one mile and two hundred and forty yards.

Another adjunct to the lantern which is often called for by the lecturer on science is known as the vertical attachment. By means of this

device an object, which from its nature must be kept in a horizontal position, can readily be shown on the screen. It is laid on a glass plate through which the light from the lantern is projected from below by an inclined mirror, the same means being adopted to project the beam once more in a horizontal direction towards the screen or sheet. By this means, and by the help of a glass tank, it becomes possible to perform experiments in chemistry, electricity, &c., so that the results shall be evident to a large audience. The applications of the lantern in this direction are rapidly increasing, and most modern instruments are so made that a large number of experiments can be shown by their aid.

The latest, and one of the most interesting, employments which the optical lantern is called upon to fulfil is the exhibition of cinematograph, or living pictures. The introduction of these pictures has aroused the same kind of enthusiasm as that once accorded to dissolving views; but a consideration of this application of the most popular of optical appliances must be reserved for another article.

JOHN BURNET OF BARNS.

By JOHN BUCHAN.*

CHAPTER XVII.—THE COMING OF THE BRIG 'SEAMAW.'

IT was the third day of April, a day so cool and mild that every one who could was in the open air, that I sat in the little strip of garden behind my lodging. The soft spring wind fluttered the leaves of my book and stirred my hair, so that I found it hard indeed to keep my attention fixed. Some yards behind me Nicol sat cleaning a fishing-rod, for in the idle days he amused himself with trying his skill among the sleepy streams. He was whistling some bars of 'Leezie Lindsay,' and the tune, which I had often heard in Tweeddale, put me much in mind of home and inclined my heart violently to the place I had left. So, soon I found my Plato lying listlessly on my lap, and my thoughts far away over the sea.

Just now, I knew, would be the lambing-time in the Tweed hills, and all the valleys would be filled with the noise of sheep. The shepherds, too, would be burning the bent, and the moors sending up wreaths of pungent smoke. I minded the smell so well that I almost fancied it was in my nostrils in place of the moist perfume of hyacinth and violet. At Dawyck, Marjory would be early abroad, plucking the spring flowers and bringing in armfuls of apple blossom to deck the rooms. The thought of Marjory gave me sudden discomfort. I reflected for the thousandth time that I had heard nothing of her for months, and I fell to wondering greatly at her silence. By-

and-by, what with thinking of home and of her, and chafing at her neglect, I found myself in a very pretty state of discontentment.

It was just then that I heard a voice behind me, and turning round saw Nicol approaching in company with another. The stranger was a man of remarkable appearance. He was scarcely the middle height, but his breadth across the shoulders was so great that he seemed almost dwarfish. He had arms of extraordinary length, so long that they reached almost to his knees. His square, weatherbeaten face was filled with much good-humour, and the two eyes which looked out from beneath his shaggy brows were clear and shrewd.

'This is Maister Silas Steen o' the brig *Seamaw*,' said Nicol, making an introduction, 'whae has come frae Scotland this mornin', and says he has letters wi' him for you.' Having delivered himself, my servant retired, and left the new-comer alone with me.

'You'll be Master John Burnet of Barns?' said he, looking at me sharply.

'The same, at your service,' said I. 'May I ask your business with me?'

'It's just a bit letter for you,' and he dived into his pocket and produced a packet.

I took it hastily, for I had some guess who was the writer. Nor was I wrong, for one glance at the superscription told me the truth. And this is how it ran :

*For Master John Burnet,
In the house of Mistress Vanderdecker,
near the Breedestraat, at Leyden.*

DEAR JOHN,—I have not written thee for long, and I trust that thereby I have not given thee trouble. I am well and happy when this leaves me, though desiring thy return. I trust your studies are to your satisfaction. Tam Todd from the Barnes was over yestreen, and gave a good account of all things there.

Then came a pause, and the writing was resumed in a hurried, irregular hand.

I am not free to write my will. O John, dear John, come back to me. I am so unhappy. I cannot survive without thee another day' (this latter word had been scored out and 'month' put in its place). 'I am in dreadful perplexity. Come quick.

MARJORY.'

You may imagine into what state of mind the reading of this letter threw me. My lady was in trouble; that was enough for me, and she desired my aid. I guessed that the letter had been written stealthily, and that some trouble had been found in its conveyance, for it bore the marks of much crumpling and haste. I could make no conjecture as to its meaning, and this doubt only the more increased my impatience.

'From whom did you get this?' I asked.

'From a great, thin, swart man, who brought it to me at Leith and bade me deliver it. I came post-haste from Rotterdam this day.'

I ran over in my mind the serving-folk at Dawyck, and could think of none such. Then, like a flash, I remembered Tam Todd. This increased my fears. If Marjory could get no porter for her message save one of my own servants, then the trouble must be at Dawyck itself.

I can find no words for the depths of my anxiety. There and then I resolved on my course.

'Your ship is at Rotterdam?' I asked.

'Yes,' said the captain.

'When does she sail?'

'To-morrow night, when the cargo is on board.'

'I'll give you twenty pieces of gold if you'll sail to-night.'

The captain shook his head. 'It canna be done,' he cried. 'My freight is lace and schiedam worth four times twenty pieces, and I canna have a voyage for naething.'

'Listen,' said I. 'I am in terrible perplexity. I would give you a hundred if I had them; but I promise if you bring me safely to the port of Leith they shall be paid. Ride back to your vessel and ship all the stuff you can, and I will be with you at eleven o'clock this night, ready to sail.'

The fellow shook his head, but said nothing.

'Man,' I cried, 'for God's sake, I implore you. It's a matter to me of desperate import. See, there are twenty pieces, and I'll give you my bond for eighty to be paid when we win to Leith.'

'Tut, Master Burnet,' said he, 'I will not be

taking your money. But I'm wae to see you in trouble. I'll tak' you over the nicht for the twenty pieces, and if I lose on the venture you can make it up to me. It's safer carrying you and running straight for the pier than carrying schiedam and dodging about the Bass. And I'm not a man that need count his pennies. Forbye, I see there's a lady in the case, and I deem it my duty to assist you.'

I was at first astonished by the man's ready compliance; but when I saw that he was sincere I thanked him to the best of my power. 'Be sure I shall not forget this service, Captain Steen,' said I, 'and if it is ever in my power to serve you in return you may count on me. You will take some refreshment before you go?' and calling Nicol I bade him see to the stranger's wants.

Meantime it behoved me to be up and doing if I was to sail that night. I knew not what to think of the news I had heard, for as I thought upon the matter it seemed so incredible that aught could have gone wrong that I began to set it all down to mere loneliness and a girl's humours. The strangeness of the letter I explained with all the sophistry of care. She did not wish to disturb me and bring me home before my time. This was what she meant when she said she was not free to write her will. But at the end her desolateness had overmastered her, and she had finished with a piteous appeal. Even so I began to reason, and this casuistry put me in a more hopeful frame of mind. It was right that I should go home, but when I got there I should find no cause for fear. But there was much to be done in the town and the college ere I could take my departure. So, when I had paid all the monies that I owed, and bidden farewell to all my friends (among whom Sir William Crichton and Master Quellinus were greatly affected), I returned to my lodgings. There I found Nicol in great glee preparing my baggage. He was whistling the 'Lawlands of Holland,' and every now and then he would stop to address himself. 'Ye're gaun hame,' I heard him saying, 'ye're gaun hame to the hills and the bonny water o' Tweed, and guid kindly Scots folk after that frostit Hollanders, and fine tasty parrich and honest whisky after the abominable meats and drinks o' this stawsome hole. And ye'd better watch your steps, Nicol Plenderleith, my man, I'm tellin' ye, and keep a calm sough, for there's a heap o' wark to be dune, and some o' it geyan wanchaney.'

'Good advice, Nicol,' said I, breaking in upon him. 'See that you keep to it.'

'Is that you, Maister John? Ye'll be clean high aboot gaun back. And ye maun mind and put a bottle o' French brandy in your valise, or you'll be awfu' oot on the sea. I think it's likely to be coarse on the water.'

I took my servant's advice; and when all was done to my liking I walked down to the college

gate for one last look at the place. I was in a strange temper—partly glad, partly sad, and wholly excited. When I looked on the gray, peaceful walls, breathing learning and repose, and thought of the wise men who had lived there, and the great books that had been written, and the high thoughts that had been born, I felt a keen pang of regret.

As I left the place there was a cool gray haze over all the gardens and towers, mellow and soft and lucid. But to the north, where lay the sea, there was a broken sky, blue, with fitful clouds passing athwart. It seemed, as it were, the emblem of my life—the tranquil and the unsettled. Yet, in the broken sky there was a promise of sunshine and brilliance, which was not in the even gray; and this mightily heartened me.

So at four that evening we mounted horse and rode forth by the way we had come; and ere the hour of eleven were on the wharf at Rotterdam, sniffing the distant smell of the sea. Captain Steen met me on deck, and greeted me heartily; and soon we dropped down the estuary and set our face seawards.

Of my voyage home I do not purpose to tell at length. On it I met with none of the mishaps which I had encountered before, and the captain I found a friendly, talkative man; from him I had much news of the state of the land whither I was returning. Nor was it of such a sort as to elate me, for it seemed as if in the short time I had been away things had taken many steps to the devil; but my time during the days of our sailing was in the main taken up with thoughts of Marjory. The word I had got still rankled in my mind, and I puzzled my brains with a thousand guesses as to its purport. But as the hours passed this thought grew less vexatious, for was not I on my way home to see my love once more, to help her in perplexity, and by God's help to leave her side never again? Every thought of home made it doubly dear to me. And, more than all else, there was my lady awaiting me, looking for the sight of my horse's head at the long avenue of Dawyck.

Then I fell to thinking of the house of Barns, and of the many things which I should do were I home. There was much need of change in the rooms, which had scarce been touched for years.

Also I figured to myself the study I should make and the books which were to fill it. Then, out of doors there was need of planting on the hillsides and thinning in the haugh-lands; and I swore I should have a new cauld made in Tweed above the island for the sake of the fishing. All this and more should I do 'when I rode through Annan Water wi' my bonny bands again.'

We left Rotterdam on the evening of one day, and sailed throughout the day following; and, since we had a fair wind and a stout ship, about noon on the next we rounded the Bass, and entered the Forth. I was filled with great gladness to see my native land once more; and, as for my servant, I could scarce prevail upon him to keep from flinging his hat into the sea or climbing to the masthead in the excess of his delight. The blue Lomonds of Fife, the long ridge of the Lammermoors, and the great battlements of the Pentlands were to me like honey in the mouth, so long had I been used to flat lands. And beyond them I saw the line of the Moorfoots, ending in Dundreich, which is a hill not five miles from the town of Peebles.

About three of the clock we entered Leith Roads and awaited the signals for admission. 'The *Seamaw* lies at the wast-harbour for usual,' said the captain; 'but there's something wrong thereways the day, so we maun e'en run into the east.' So soon, amid a throng of barques at anchor and small boats moving to and fro among them, we steered our course and in a very little lay against the gray sea-washed walls of the east quay. There we landed after bidding farewell to the captain; and as my feet touched the well-worn cobble-stones, and I smelt the smell of tar and herrings, I knew my own land. The broad twang of the fishermen, the shrill yatter of the fishwives, the look of the black, red-tiled houses and the spires of the kirks—all was so familiar that it went straight to my heart; and it was with a cheerful spirit that, followed by my servant, I made for the inn of 'The Three Herrings,' where I purposed to sleep the night ere I rode to Tweeddale on the morrow. So much for man's devices: this was to be to me the last day of quiet life for many months. But as I briskly strode along the harbour walk, little I foresaw of the dangers and troubles which awaited my coming.

M I N E-S A L T I N G.

WHAT is known as the 'salting' of mines is much more common than most people imagine. It is practised in every mining district in the world with more or less success, and it is hardly too much to say that fully ten per cent. of the foreign and colonial mines sold to London companies are purchased

on salted workings or samples. The methods of salting adopted are almost as various as the mines doctored. The simplest, and probably one of the earliest means of salting in the case of gold-mines, is what is known as the 'nail trick.' In this, the prospector, who is washing a dish of alluvial or crushed quartz, has concealed in his finger-nails some fine particles of gold. Soon

after starting to wash he finds it necessary to puddle the dirt with his hands in order to break up the clayey substances, and of course while he is puddling, the gold is freed and goes into the prospect, eventually making that pretty 'corner' which the speculator so likes to see. Perhaps, however, the nefarious prospector has his nails too short for this trick, and he will then resort to the expedient of shooting fine gold into the dish from his mouth whenever he gets an opportunity of doing so without being observed. Or he will raise a hand to put his hat straight, and at the same time shake into the dish some gold-dust from his hair. But sometimes the speculator or expert present, whose good opinion of the property is wanted, resolves to wash a dish or two himself; and then the prospector has to resort to other tactics. He will, however, probably have provided for the contingency, and will be pretty sure to find some means of salting the new sample or the dish before the water touches it. Supposing that circumstances are against him in this, then he will have recourse to a pipe or cigar properly prepared for the occasion. The chances are that the washer will not notice the apparently accidental falling of tobacco-ash into his dish, and the trick will have succeeded.

The salting of prospects while under process of dishing is, however, fast dying out, prospectors preferring the more solid business of salting the earth or rock as it lies *in situ*, or of bringing stone from other mines and preparing an ingenious pack. Formerly the most common method of salting a barren reef was to fire gold-dust into it from a shot-gun; and many a mine has been sold for a good figure on the strength of a reef faked in this way. But the shooting process is unsatisfactory for many reasons. In the first place, it only answers at all for certain classes of rock; then the reef into which gold has been fired has a patchy appearance, which is not a favourable sign; and again much of the gold fired is lost, while the explosion of the gun in a narrow drive or crosscut is liable to bring down a lot of the ground. All these are serious objections; but what chiefly brought the shooting practice into disrepute among salters was the fact that the prospective buyers of the mines, or their representatives, gradually became suspicious of fair faces, and often insisted upon taking their samples a foot or so back from the face. The biggest coup on record effected by the shooting trick was brought off in Tasmania, where nearly half an acre of sandstone was fusilated, and a great deal of money made by the salters, the purchasers believing that they had really acquired the biggest gold-mine in the world.

The art of salting is carried to its highest pitch of perfection in the process known as 'stacking'. This is performed by building up a portion of a

reef at the end of a drive which has been run underground along the line of the reef. Of course the built-up portion must be made to look like unbroken ground; but this is sometimes a most difficult task to accomplish. Luckily, however, for the salters, few of the best gold-reefs are without very numerous fractures, and indeed they not infrequently look like bands of mullock held together by a clayey substance impregnated with iron oxide. Such reefs, which are not uncommon in Western Australia, are much easier to imitate than the hard white reefs of Ballarat or the wide gold bands of South Africa. Usually the stacking has a depth of from four to five feet, though in exceptional cases it is considerably greater. A well-known London mining engineer discovered a depth of no less than ten feet in a stack prepared for him in Colorado. It need hardly be said that when only the end of a drive is stacked, it is found necessary to timber the roof and keep a judicious supply of water and loose planks on the floor, while of course the original reef is taken out for its entire width. Past masters in the art of stacking hail usually from the States, but Australia has produced two or three prime examples.

Stacking is usually performed in isolated mines, where the operations of the salters are not likely to be watched or interrupted. In cases where there are several mines in the same neighbourhood, the salter generally resorts to doctoring the expert's samples, after perhaps judiciously peppering the workings with damp gold-dust. Occasionally the expert is one who treats every man at a mine as a possible salter, and hence successfully guards his samples; but usually he takes only ordinary precautions, which are of no earthly avail against an experienced salter. If he sends his samples up the shaft open in a bucket, having some one on the surface to look after them, gold-dust is blown into it from an intermediary drive as it is rising, or gently let fall into it from the top just as it reaches the brace. If the expert takes his sample bags down the shaft, with the intention of sealing them up underground, he will not notice with the falling dust from the top and sides of the shaft a fine shower of gold-dust following him down, lodging on his hat and over his clothes; and if for one minute he loses sight of those sample bags when he has returned to the surface, they will be judiciously primed by means of sharp injectors, which leave no trace of their work. Of course all this is supposing a salter is on the watch.

Should the salter fail altogether to tamper with the samples, or to deceive the expert underground, his only chance is to fake the samples at the assay office to which they are taken. This requires a confederate, and is usually very difficult; but it has been done successfully

many times. In one case—the St George mine in Australia—the culprit was discovered, and he received two years' imprisonment; but meantime he had cleared a few thousands of pounds.

Occasionally diamond drills are put to work in gold country to test the value of reefs at great depths. They cannot be considered satisfactory for this purpose, as a drill might just miss a shoot of gold, or else go through a very short one and thus lead to false hopes. Salting these drills has been successfully accomplished on several occasions, the practice being to hammer gold into the interstices of the core, or else to surreptitiously introduce an entirely new piece of core which had been previously prepared. Near Bright, in Victoria, a great deal of money was put into a mine a few years ago on the faith of a salted drill-hole.

Sometimes it happens that a really good property is salted. Thus one of the large mines now working at Broken Hill, and which has turned out an enormous quantity of silver and lead, was originally sold on a salt of several tons of ore conveyed from a neighbouring mine, and carefully stacked about an outcrop. In New South Wales a gold-mine that paid dividends for years was sold in the same way. On the faith of the promising 'surface show,' a shaft was sunk, and at about two hundred feet a splendid body of auriferous stone was struck. In Tasmania an alluvial tin-mine which had been salted led the purchasers to the discovery of a gold-reef which amply repaid them for their outlay.

A few instances of remarkable cases of salting may be interesting.

Many persons will perhaps remember the great tin-mine salting case in Canada, which was probably the most cleverly contrived swindle of its kind on record. The operators, two in number, purchased from time to time some small parcels of tin-ore in Cornwall and shipped it to Toronto, taking care never to send more than a few bags in any one vessel. From Toronto the ore was taken out West some hundreds of miles and carefully planted along a granite ridge, the work of shipping and planting taking about twelve months to accomplish. The salters then left the scene and remained away for some three years. At the end of that time it was suddenly announced at Quebec that what appeared to be a large and rich tin-field had been discovered in the West, and a claim had been put in for the government reward of (I think) sixty thousand dollars, which had been several years on offer for such a discovery. As might be expected, considerable excitement was manifested over the reported find, and when the government expert who was sent to inspect the property pronounced the discovery to be genuine, there was quite a rush of prospectors and speculators to the West, anxious to peg out or to purchase tin claims. Meanwhile a

company was formed to work the reward claims; and just when it was ready to commence work, the government, acting on the reports of its skilled advisers, paid over the reward to the claimants, who, with this sum and a further large amount obtained by the sale of their claims, suddenly disappeared and were never afterwards heard of. It is scarcely surprising that the Canadian experts were deceived, as grass and moss and other vegetation had grown over the packed ore, while the denudation of the hillsides had resulted in some of the tin being washed into neighbouring creeks, where it was covered over with sand and debris. The swindle was exploded by a Cornish expert who had been sent for. He recognised the ore as having come from certain Cornish mines, and its sale and shipment were thereupon quickly traced.

The Mount Huxley mine in Tasmania afforded an instance of a most successful salt. A tunnel was put in a hill for a distance of about one hundred feet, and the sides, roof, and floor were well salted with fine gold-dust. The so-called mine was then offered to a Sydney syndicate, who purchased it on the advice of an expert. Indeed his account of the property was so glowing, and the assays made from various samples taken were so good, that the shares in the syndicate went up to an enormous price. Gradually the Mount Huxley mine got to be talked about all over Australia as a possible second Mount Morgan, and preparations were made by the syndicate to float a company on a large scale. But the ardour of the shareholders was suddenly and effectually damped by the report of a government officer who was asked to examine the property, and who declared to the effect that it was no mine at all, but purely a commonplace though rather extensive salt. An attempt was made to prosecute those concerned in the swindle, but no direct evidence could be procured. About £30,000 was lost by Sydney speculators in this venture.

Salters, however, do not always escape punishment. A case occurred in South Australia in 1895 in which a man was sentenced to two years' imprisonment for swindling in this way. The culprit did not, however, tamper with the mine, but carefully salted the bags of samples taken from a shaft by the various experts and speculators who inspected the property. This mine, in which there was undoubtedly a little gold *in situ*, was quite exceptional in one way, inasmuch as all the subscribing shareholders in the company which purchased it were members of the South Australian parliament. Needless to say, the mine was 'dropped like a hot brick' when the fraud was discovered.

In another well-known case, about thirty holes were sunk along a series of alluvial claims in Tasmania, and salted with tin. The property was then offered to a Melbourne syndicate, who had it inspected and eagerly purchased it. It

was only after a company was formed, and big hydraulic machinery erected on the claims, that the swindle was discovered.

One of the most notable Australian salting cases was that connected with the Boomerang mine in South Australia. The culprit, whose name was Marshall, went to work in quite an extensive way, spending a great deal of time and a considerable sum of money in manipulating the venture. He selected a spot of barren mineral country in the Flinders Range, about thirty miles from a habitation, and having pegged out over a hundred acres of ground, he sunk three shafts to a depth of about sixty feet each. He then sent up from Adelaide a party of surveyors, and had elaborate plans drawn showing a systematic series of huge silver lodes; and experts were obtained to give most elaborate and highly-coloured reports upon the property, with the usual lists of remarkable assays of samples 'carefully taken' from the shafts. In fact the Boomerang was reported to be quite equal to the great Broken Hill mine in its initial stage. Armed with his large coloured plans and voluminous reports, Marshall then set about reaping his harvest. He first went to Adelaide, and in a few days sold various small interests in the Boomerang for a total of £1100; then proceeded to Melbourne, where he sold two-sixteenths for £3000 each, and a thirty-second for £1250; and wound up in Sydney, whence, having cleared £2500 more, he took ship under an assumed name for San Francisco. The development of mines is slow work, and it was a couple of months before the purchasers of shares in the Boomerang commenced to wonder why they heard nothing more of the mine. Then of course the swindle was uncovered, but it was too late to get back either Marshall or the money.

The colony of Victoria had a very bad case of salting exposed last year. About three years ago, a certain 'Colonel Morgan' (the title American), who was formerly at Broken Hill, and before that in Nevada, U.S.A., was sent to take charge of a reported valuable silver and lead mine in Gippsland owned by a Melbourne company. The colonel sent down from time to time glowing reports upon the mine, and after some months a few tons of silver-lead ore were forwarded to Melbourne from the property, and sold at a satisfactory price. Strange to say, however, the regular delivery of ore was not maintained, but the colonel explained this by reporting that though there were immense bodies of ore practically exposed,

yet the mine wanted properly opening up before the ore could be dealt with on a large scale. Time went on, and funds giving out, the company was reorganised; the splendid reports of the work in hand which reached Melbourne every fortnight rendering it easy to obtain fresh capital. Then one fine day the colonel reported that the mine was sufficiently developed for the erection of machinery, and the directors were specially asked to visit it and see for themselves what a magnificent property they had. The journey was long and difficult; but the visiting party from Melbourne felt themselves well rewarded for their trouble when they examined the workings, and saw on all sides of them, and overhead, and underfoot, magnificent carbonate and sulphide of lead ore rich in silver. In every place exposed there was ore, and judging from appearances there was practically an unlimited supply. The directors returned to town highly pleased, and at once made arrangements for the erection on the mine of concentrating and other machinery. Meanwhile the shares of the company rose high in the market, the result of the directors' visit having become widely known. But suddenly, just when the machinery orders had been placed, it was discovered that the colonel was missing, and that he had sold all his shares, his holding having been pretty large. The reason was immediately forthcoming, for an overseer at the mine confessed, under promise of freedom from prosecution, that he had been a confederate of the colonel in 'stacking' the mine. It turned out that there was actually some ore there, though only a few bunches, and this had been used by the colonel in packing the sides and floors of the workings. It took him many months to do the work, as there was a lot of trouble in procuring sufficient ore, and it is no easy task to pack a drive; but he was eminently successful, as has been seen. It is hardly necessary to add that the colonel has not been heard of since.

Over three hundred ounces of gold were used to salt a mine in New South Wales some few years ago, with the result that the property was purchased by a Sydney syndicate for £30,000. So well was the salting done that expert after expert was deceived, and it was not until the market price of the syndicate shares totalled over £400,000 that the property was proved to have been 'prepared.' The discovery of this fraud gave a blow to mining in New South Wales from which it took a long time to recover.



THE FRENCH AT LAKE CHAD.



HERE is a fascination about the internal lakes of Africa far out of proportion to their value in a commercial sense as waterways. Not only is this the case with the great equatorial lakes, but far away

to the north-west, on the borders of the waterless Sahara, Lake Chad has drawn the attention of explorers since the famous journeys of Barth and Nachtigal. Especially has the region had an attraction for our immediate neighbours across the Channel, who have long wished to make of the Chad a French lake. French ambition, in fact, has gone so far as to contemplate the possession of practically the whole of North Africa. But it was not to be expected that the other powers, which have been scrambling for and cutting up the Dark Continent, should acquiesce in this; and the agreements which have delimited the 'spheres of influence' of Great Britain, France, and Germany have brought each of the three nations into touch with the lake. By the agreement of August 1890, the English sphere extends along the west side of the lake southwards from Barua, a place of no importance and now in ruins, which our diplomats 'in their wisdom' for some reason fixed upon; whilst by a treaty with Germany (15th November 1893), the eastern frontier of the English sphere touches the lake at a supposititious point thirty-seven minutes to the east of the meridian of Kuka, or in longitude fourteen degrees east. The Franco-German boundary (agreement of 4th February 1894) to the east is equally absurd, except so far as it takes the river Shari for the dividing line. No regard is had in this ridiculous arrangement for the political divisions of the native states.

So far as Germany is concerned, the frontage on the lake seems to be a matter of sentiment, for no expedition has yet been sent so far as its shores. From our own Niger possessions an attempt was made in 1889 to open up communication with the lake, when Sir Claude Macdonald was sent by the British government on a mission to the Niger. Starting from Akassa on 26th July, Sir C. Macdonald ascended the Niger and Benue in the river-steamer *Boussa*, his plan being to steam as quickly as possible to the highest navigable point on the Benue River (some nine hundred miles from the sea), thence to make a dash in a small launch up the Kebbi River and endeavour to find a waterway to Lake Chad. (See Mockler-Ferryman's *Up the Niger*, 1892.)

The *Boussa* drew six feet of water, and in this Sir Claude Macdonald was able to get as far as Garua, the highest trading station of the Royal Niger Company, some distance above Yola. Here the steamer was left, and the farther ascent was made in a steam-launch drawing only fifteen

inches of water. Some ten or twenty miles above Garua, the Benue receives from the north-east a considerable stream, known as the Kebbi River, which has a width of about two hundred and fifty yards at the junction. Native reports, partly confirmed by Barth, were to the effect that by ascending the Kebbi the Tuburi marshes would be reached, and that in the wet season these marshes communicated with the river of Logon, which flowed into the Shari and then into Lake Chad. The object therefore was to test the supposed waterway from the Benue to Lake Chad, the course of the Kebbi having hitherto been unexplored.

The third day's steaming brought the little vessel to an open expanse of water, some three miles long by a mile and a half in width, called by the natives Habarat. Hippopotami were splashing about, but a swamp and the high rushes prevented the steamer from approaching the native town on the north shore, and the natives were too timid to approach close in their little canoes. The town was of considerable size and built of quadrangular mud huts, and was afterwards discovered to be named Bifara or Bipara. For some time search failed to find a channel leading beyond this lake, and it almost looked as if the lake was itself the source of the river. After one or two unsuccessful attempts to open up communication with the naked natives on the south shore, who entered the water brandishing their spears above their heads, an interpreter succeeded in gaining their confidence with a present of cloth, and one of the elders of the tribe was persuaded to come on board the little craft and act as pilot on the promise of a liberal present. The naked old savage fairly shivered with fright as he crawled on deck, and never relinquished his hold of a bundle of villainous-looking spears. Dozens of little canoes followed in case of treachery, as the steamer passed into a deep and winding channel, some twenty yards in width, flowing between banks thickly planted with dhurra. But after a few miles of difficult navigation, the length of the launch (sixty feet) prevented its rounding the sharp bends of the stream, the bows frequently running on one bank whilst the rudder suffered from violent contact with the other. This was disappointing, especially as the guide said they would find a little farther broader water again and be able to arrive at a large town called Lere, some twenty miles higher up the stream. There was nothing for it but to turn back, though turn they literally could not in a stream less in width than half the length of the boat, and it was necessary to let the launch drift down, stern foremost, with the current, all hands standing ready with poles to shove off as it bumped against the banks. It was now the

height of the rainy season, the volume of water was inconsiderable, and it was evident that the stream farther would not be practicable for commercial purposes.

More active and persevering attempts to reach Lake Chad have been made by the French from their possessions on the Lower Congo and in the Western Soudan. From the former M. Fourneau ascended the Sanga River and its tributary the Masa in 1891; and farther to the eastward M. Paul Crampel in the same year reached as far as El Kuti, south of Wadai, where he was made prisoner by the sultan and handed over to the adventurer Rabah, together with one hundred and fifty Martini rifles which he had with him. Crampel and many of his men died of fever. M. Jean Dybowski was sent out to ascertain his fate and to punish the evildoers. Starting from Loango, he crossed to Stanley Pool, then ascended the Congo and Ubangi to Bembe and pushed northward through a country rendered difficult through heavy rains until he reached the upper Shari, when want of provisions compelled him to retrace his steps.

A far more important and successful journey was made from Senegal by Lieut.-Col. P. L. Monteil, who started from St Louis in 1890, and after reaching Lake Chad returned across the desert to Tripoli. The account of his journey was published in 1895 in a sumptuous quarto volume (*De St Louis à Tripoli par le Lac Tchad*).

The Anglo-French convention for the delimitation of the spheres of influence to the west of Lake Chad contained the provision: 'The Government recognises the sphere of France to the south of the Mediterranean up to a line from Say on the Niger to Barua on Lake Tchad, drawn in such a manner as to comprise in the sphere of action of the Royal Niger Company all that fairly belongs to the kingdom of Sokoto.' This convention was signed on 5th August 1890, and on the following day Monteil was commissioned to explore this Say-Barua line. Taking with him ten Senegalese soldiers and a French non-commissioned officer, he on 9th October set out for the interior from St Louis, going by water up the Senegal River to Kayes, the chief town of the French Soudan. From there he travelled overland to the Niger, which he reached at Bamaku. Until beyond Segu he was still within the territory effectually held by the French government, Segu having been taken from Ahmadu by Colonel Archinard only a few months before. From Segu it was Monteil's intention to cross what the French call the buckle of the Niger—that is the land within the great bend—direct to Say. But the country was now much disturbed by the war between the French and the Fulah or Toucouleur leader, Ahmadu, and it was necessary to make a considerable detour to the south by way of Sikasso. From here he again turned his steps eastward, signing

treaties with the fama (king) of Bussura, in the Bobo country, and the Almamy of Lanfiera, in Dafina—placing their territories under the French protectorate. Near Lanfiera he crossed the upper waters of the Volta, which was here about forty yards wide and about six feet deep.

At Wagadugu, the capital of Mossi, where he arrived on 28th April 1891, he met with a different reception. The Almamy, whose predecessor had shown himself hostile when Dr Crozat visited the town in the previous year, had recently returned from a pilgrimage to Mecca. Mossi is an important negro state which has not only preserved its independence, but possesses an ancient negro civilisation, differing in this respect from the barbarism which elsewhere attaches to negro institutions. Tradition carries back the origin of the royal family of Mossi to the creation of the world. The first Naba (king) had three hundred and thirty-three children, amongst whom he divided his country on his death, and it is said that this division exists to the present day! The government of the country is well organised, under a number of nabas, all subservient to the Naba of Wagadugu, who takes the title of Naba of Nabas, though his authority is little more than nominal. The country is settled, prosperous and peaceful, and is, Monteil says, the one country of the Soudan where the villages are not fortified. Millet, haricots, cotton, and indigo are cultivated, and the people possess fine horses and donkeys. Weaving is carried on, and the cotton cloths of Mossi are valued throughout the Soudan. It is in Mossi also that are found the cowrie shells which form the medium of exchange in the Soudan. Prosperous and free from outside domination as they were, therefore it is not to be wondered at that the rulers of Mossi resented the intrusion of foreigners. Accordingly the Almamy soon brought Monteil an order from the Naba of Nabas to leave Wagadugu at once, and by the way he had come. In vain did the traveller represent that he was an envoy from the French government, and had presents for the Naba. The only reply was: 'It is the king's order.' And the little party was escorted for some distance along the road it had come, by the men of Mossi, in drenching rain.

Turning more to the northward, Monteil pushed on towards Say, signing treaties with the Fulah Emir of Liptako, and the avaricious king of Zebba, in the Yagha country. At Nadiango, in the Torodi country, the king refused to see him and would have nothing to do with a treaty; but Ibrahim, king of Ouro-Gueladjio, who is said to be the paramount Fulah chief of the country between Say and Liptako, was more amenable, and he accepted a treaty of protectorate (12th August 1891). Seven days later the Niger was reached at Say, where the king also accepted the protectorate as a matter of course. Say is not a town of great commercial importance.

From this point Monteil was entering on the territory which the Anglo-French treaty referred to; and it was generally understood that the countries to the eastward were comprised in the Fulah empire of Sokoto. Not so, says Colonel Monteil, with regard to the districts between Say and the town of Sokoto. Between these two points there are or were, it seems, three states: Djerma, Mauri, and Kabbi, whilst to the south of these is Dendi. Djerma and Dendi are peopled by the Sonrhai (Songhay) race; Mauri and Kabbi by Hausas. The chiefs of these states, whilst independent of each other, recognised the sovereignty of the king of Kabbi. They had been free from the domination of the Emperor of Sokoto for thirty years, and had long proved a thorn in the side of the latter, so that a few months after Monteil's visit the Emperor of Sokoto entered into league with Ibrahim Guelaljio against them, and whilst the former took Argungu the latter took possession of Djerma and Mauri. This took place in the early months of 1892. Monteil considered himself free to negotiate with these states, but the kings of Djerma and of Kabbi would have nothing to do with treaties. At Mauri permission for the travellers to pass through the country was made to depend on the result of a raid by the king against Gandé. As he returned from this raid with a booty of six hundred captives, Monteil was allowed to proceed without molestation.

It was not until within a few stages west of the town that Monteil entered the territory of the powerful Emperor of Sokoto. At the capital he was favourably received by the emperor, who had just succeeded to the throne, and was induced to sign a treaty, although, unknown to him, a treaty had been signed in the preceding year (1890) between his immediate predecessor and the Royal Niger Company, besides one entered into with Mr Joseph Thomson in 1885. From here Monteil travelled by way of Gandi to Kano, the most important town of the central Soudan. Here he was detained three and a half months, and the king of Kano tried to dissuade him from going to Kuka, the capital of Bornu, telling him that a white man had been sent back from there. This, it afterwards turned out, was Mr Charles Mackintosh, a representative of the Royal Niger Company. Monteil learned that Mackintosh had been turned back from Kuka because he had arrived there without asking permission to enter the town, perhaps also because the Arabs were afraid the whites would take away their trade.

From Kano, Monteil reached Madia, the first village in Bornu, by a route, previously unexplored, between those of Clapperton and Barth. The villages passed by the earlier travellers had in many cases been removed to other situations owing to want of water. Monteil was received with evident want of cordiality by the Ghaladima (king),

who was next in power to the Sheik, but was given permission to approach the capital. On arrival at Kuka (9th April 1892), he was met by a body of one hundred and fifty horsemen dressed in coats of mail, who rushed up to him lance in hand, only halting when their weapons were within a few inches of his face and breast. This trying and dangerous ordeal, it turned out, was intended as a great honour. Then the horsemen turned round and escorted him to the gates of the town, where his entry was witnessed by forty thousand people. A day or two after, he was received in grand audience by the Sheik. Having no letter of authorisation, he with a Frenchman's readiness concocted one, which, being in French, no one could read, so that the fraud escaped detection. Here, as everywhere, he had to make numerous presents to the Sheik.

Monteil, unlike Mackintosh, found it easier to get into Kuka than to get out. Desiring to return by way of Tripoli, the Sheik gave his consent for him to do so, but it was three and a half months before he succeeded in leaving the town. It soon became evident that the policy of delay was indulged in with a view to fleecing the travellers. But the day at last came, and on 15th August he set out with a caravan which was returning to Murzuk. Then came the weary ride across the waterless desert, trying alike to man and beast. It was with quite a relief that he again came upon the signs of civilisation. At Murzuk he was comfortably lodged in the house which had been occupied in 1870 by the unfortunate Miss Tinné, whose murder, he learned, was not due to the Tuaregs, as generally supposed, but to an Arab of the Oulad-bon-Sef tribe, named Ethmann-bon-Badia, who in his turn deservedly met with a violent death twenty years later. Here the Turks have a garrison of five hundred men, and here also Monteil saw a number of Cretan, Armenian, Albanian, and Servian Christian prisoners, who had been sentenced to transportation.

On 10th December 1892, Colonel Monteil was welcomed at Tripoli by the French consul after a journey across the desert of nearly four months, and after carrying out successfully the boast with which he started, 'With ten armed men I could cross Africa.'

It was reported at the end of last year that a French vessel had been afloat on the waters of Lake Chad. M. Gentil in 1896 proceeded to the Shari basin by way of the Ubangi, taking with him a small steamer in sections to place upon the former river. He reached the Nana, a southern tributary of the Shari, and his steamer, the *Leon Blot*, had been put together on the river, and in May last started on its voyage to the lake. A letter, dated July 25, 1897, from a Frenchman in Upper Egypt, announced that the *Leon Blot* had reached Lake Chad. 'We may be proud of that,' said the writer; 'it is the first vessel afloat on the mysterious lake, and it is a French boat.'

BORING OIL-WELLS IN THE SEA.



CORDING to the *Scientific American*, the early settlers in California were familiar with indications of the existence of oil which were seen at various points along the coast, while asphaltum, which oozed up from beds at the bottom of the sea, formed an important factor in the household economy of the aborigines, and in almost every burial-place on the coast asphaltum is found. The natives employed it to mend objects which were broken and as a base in which to place ornamental pieces of pearl mosaic. Baskets were fastened to ollas or jars by this means, and it was used for endless purposes in lieu of nails, cordage, and glue. The natives on the islands obtained their supply from the water, and at the present day the rocks at various places can be seen splashed with asphaltum which has drifted in. This is particularly noticeable after an east wind, showing that there is a large area in the deep Santa Catalina channel from which asphaltum oozes up. Off Redondo beach, in Los Angeles County, it is extremely troublesome, oozing out of the sand off-shore and drifting in. Between Santa Monica and Los Angeles there are undoubtedly deposits, and north of Santa Barbara several enormous ones. That owned by the More estate extends some distance along the shore, so that vessels are run in, and the asphaltum is shovelled on board. The quality of this asphaltum is stated to be equal to that of Trinidad.

Oil-wells were sunk at Santa Paula some years ago; and, later, an oil-producing belt was discovered at Puente, and again at Summerland, below Santa Barbara, where a singular state of affairs exists. It soon became apparent at the latter locality that the oil-bearing stratum stretched out into the sea, and drill scaffolding, looking like windmills without sails, began in a short time to extend down the little cañon, and to creep up the shore in the direction of Santa Barbara. At first they kept along the sides of the hills which breast the sea there; but gradually they turned seawards, until one more adventurous than the rest rose from the water. Work was started at an extremely low tide, and finally the tall scaffolding appeared twenty or thirty feet from the shore, rising from the sea. At present there are three borings, which even at low-tide are in the water, but at flood-tide are completely surrounded, the men working on platforms of various heights, which they successively ascend as the sea rises. So far the structures that have been built in the sea have not yet experienced a strong south-wester; but, as some of them stand in six feet or more of water at high-tide, in a severe storm their existence will become precarious. The drills are worked in the water from

an engine on the beach, the fuel being the oil pumped up. This is probably the only place where oil is pumped out of the sea, but undoubtedly the entire coast overlies an oil-producing stratum. Off what is known as More's Wharf, half-a-mile out, oil rises to the surface in several places. A spring of fresh water also rushes up there with such velocity that it can be taken up and used if the slightly brackish taste is not objected to. A similar spring is known to exist on the Florida coast, where, it is said, a vessel can lie alongside the great rush of water and fill her tanks with fresh drinking-water out of the ocean.

Probably one of the strangest sights in oil-wells is seen at Los Angeles. There oil was first discovered in the western district, the choice residential part of the city; but, like magic, the lighthouse-like scaffoldings began to rise until the place appeared fairly to bristle with them. Fine residences were ruined by the proximity of the unsightly objects; and, finally, the whole place was given over to the oil-drills, and at present it resembles certain portions of the oil-region of Pennsylvania. The borings have advanced in a well-defined north-easterly direction, and at present appear to be stopped by the large Catholic cemetery, which overlies the oil stratum. Not far distant is the Los Angeles River, which probably will ultimately be encroached upon and made to give up its hidden riches. The discovery of oil in and about Los Angeles promises soon to supply the long-wished-for power required for manufacturing purposes. The Terminal Railroad has adopted the oil as fuel, and the Southern Pacific is said to be experimenting in the same direction. California is without deposits of coal, if we except lignite beds which crop out in various places, so that oil as a fuel will supply a want long felt at Los Angeles, and become a factor in the rapid development of this growing city.

PERCHANCE.

PERCHANCE some day, when twilight-tide has crept Across the fens and widening willow-ways,
You will recall those days when passion slept
Unwakened by the kiss that thrills and slays;
You will look forth across the northern sea
And hear its thunder beating towards the bay,
And think of all our love that used to be,
Perchance some day.

Perchance some day, when slowly in the east
The dim, drear dawn is breaking—and the hum
Of busy feet is hushed—of me, the least
Of all your lovers, hallowed thoughts will come.
And I shall dream, and see you—eyes that yearn
Will gaze in yours—our hands will clasp and stay.
And so by spirit-paths you will return
To me—some day.

WALTER THACKWELL.